as an end of the first transmission path, at least one of said corresponding and separated surface areas of each of said transmission paths being extended in length as a ring shape or slit shape on said surface at substantially constant spacing from the other corresponding and separated surface area of said each of said paths, the total length of said [extended] ring or slit surface area of said each of said transmission paths being substantially greater than the mean distance separating said corresponding and separated surface areas defining each of said transmission paths;

sensing a plurality of independent signals developed at the same time or in rapid sequence representing optical information obtained from a spectrum related to [the] analytes and interferences within said material in response to said illumination passing along different transmission paths, each signal corresponding to a particular transmission path; and

processing and combining said signals in accordance with appropriate chemometric modeling techniques and determination of model parameters during the calibration process to determine qualitative characteristics of the material.

7. Apparatus for optical interactance measurements of an interior portion of a material, said measurements being effected by passing illumination through portions of the material comprising:

apertures [aperture means] for defining corresponding and separated surface areas on said material for defining each of a plurality of transmission paths through an interior portion of said material, one of said corresponding and separated surface areas for passing illumination into said material as beginning of a first transmission path and the second of said corresponding and separated surface areas for passing illumination from said material for detection as an end of the first transmission path, at least one of said corresponding and separated surface areas of each of said transmission paths being extended in length as a ring shape or slit shape on said surface and substantially constantly spaced from its corresponding surface area, the total length of said [extended surface] ring shape

or slit shape area of each of said transmission paths being substantially greater than the mean distance separating said corresponding and separated surface areas defining said each of said transmission paths;

[means] illuminator for directing illumination onto said illumination surface areas and along said transmission paths;

[means] sensor for sensing optical information indicative of said interior portion of said material developed by illumination passing along said transmission paths to said detection surface areas of said transmission paths;

[means] signaler responsive to said sensing means, for developing a plurality of independent signals corresponding in number to said plurality of transmission paths, each of said signals representing said optical information obtained in a spectrum related to analytes and interferences within said material; and

[means] processor for combining and processing said signals in accordance with appropriate chemometric modeling techniques and determination of model parameters during the calibration process to determine quantitative or qualitative characteristics of said material.

33. A method for improving optical interactance measurements comprising the steps of:

passing illumination along a plurality of different transmssion paths through an interior portion of a material having a characteristic to be measured;

defining each of said paths by corresponding and separated surface areas on said material, one of said corresponding and separated surface areas for passing transmitted illumination into said material as a first transmission path and [the] a second of said corresponding and separated surface areas for passing transmitted illumination from said material for detection as an end to said first path, at least one of said corresponding and separated surface areas of each of said transmission paths being extended in length as a ring or slit at substantially constant spacing from the other corresponding and separated surface area of said

each of said transmission paths, the total length of said extended surface area of said each of said transmission paths being substantially greater than the mean distance separating said corresponding and separated surface areas defining each of said transmission paths, an extended surface area of one of said transmission paths being contained within [the] a boundary defined by an extended surface area of another of said transmission paths;

sensing a plurality of independent signals developed at the same time or in rapid sequence representing optical information obtained from within said material in response to said illumination passing along different transmission paths, each independent signal corresponding to a particular [paths] transmission path; and

processing and combining said signals in accordance with appropriate chemometric modeling techniques to determine qualitative characteristics of the material.

35. A method for improving optical interactance measurements comprising the steps of:

passing illumination along a plurality of different transmission paths through an interior portion of a material having a characteristic to be measured;

defining each of said transmission paths by corresponding and separated first surface area and another surface [areas] area on said material defining a first transmission path, at least one of said first surface areas of [one of] said first transmission path [paths] being extended in length as a ring shape or slit shape at substantially constant spacing from the [other] another surface area of said [one] first transmission path;

sensing a plurality of independent signals developed at the same time or in rapid sequence representing optical information obtained from within said material in response to said illumination passing along said different transmission paths, each independent signal corresponding to a particular transmission path; and

processing said signals in accordance with appropriate modeling techniques to determine qualitative or quantitative characteristics of the material;

wherein said steps of passing illumination and sensing are provided by an instrument for said interactance measurement and said method further includes the steps of moving said instrument to a predetermined distance away from said material and performing a reflectance measurement of said material.

36. Apparatus for optical interactance measurements of an interior portion of a material, said measurements being effected by passing illumination along a plurality of different transmission paths through an interior portion of a material having a characteristic to be measured, comprising:

aperture [means] operative to define each of said different transmission paths by corresponding and separated surface areas on said material, one of said corresponding and separated surface areas for passing illumination into said material and [the] a second of said corresponding and separated surface areas for passing illumination from said material for detection, at least one of said corresponding and separated surface areas of each of said transmission paths being extended in length as a ring shape or slit shape at substantially constant spacing from [the] one other corresponding surface area, the total length of said [extended surface] ring shape or slit shape area of each of said transmission paths being substantially greater than the distance separating said corresponding and separated surface areas defining each of said paths,[,] an extended surface area in the shape of a ring or slit of one of said paths being contained within [the] a boundary defined by [an extended] a surface area in the shape of a ring shape or slit shape of another of said paths and being substantially surrounded by the extended surface area of said another of said paths;

[means] illuminator for directing illumination onto said illumination surface areas and along said transmission paths;

[means] sensor for sensing optical information indicative of said material developed by illumination passing along said transmission paths to said detection surface areas of said transmission paths;

[means] signaler responsive to said sensing means, for developing a plurality of independent signals corresponding in number to said plurality of transmission paths, said signals representing said optical information obtained from within said material; and

[means] processor for processing and combining said signals in accordance with appropriate chemometric modeling techniques to determine quantitative or qualitative characteristics of said material.

37. The apparatus of claim 7 wherein said aperture [means are] is operative to define said surface areas of each of said transmission paths to be parallel.

43. A method for effecting optical interactance and reflectance measurements relative to a material[,] having a characteristic to be measured, comprising the steps of:

providing optical means, at a first predetermined distance from a surface of said material, for defining on said material at least one illumination surface area and at least one detection surface area which are separated, said illumination and detection surface areas on said material defining at least one transmission path through an interior portion of said material for performing interactance measurements, at least one of said surface illumination and detection areas of one of said transmission paths being extended in length at substantially constant spacing from the other surface detection and illumination area of said one transmission path;

providing said optical means at a second predetermined distance, relative to the surface of said material, for defining said illumination and detection surface areas on said material which are at least partially superimposed, thereby defining a surface area on said material for performing diffuse reflectance measurements;

illuminating said illumination area and detecting optical information received from said detection area for developing signals representing said optical information obtained from said material in response to said illumination; and

processing said signals detected by said optical means in accordance with appropriate modeling techniques to determine quantitative or qualitative characteristics of the material.

46. The method as in claim 45 wherein said optical means, at said first distance, defines at least one of said illumination surface areas [as extended in length] as a ring shape or slit shape.

47. The method as in claim 45 wherein said optical means, at said first distance, defines said at least one detection surface area as extended in length as a ring shape or slit shape.

48. The method as in claim 43 wherein said optical means, at said first distance, defines at least one of said illumination surface areas and said at least one detection areas as [extended and] parallel ring shapes or slit shapes.

49. The method as in claim 43 wherein said optical means, at said first distance, defines at least one of said surface areas to be extended as a ring shape or slit shape and to define another of said surface areas to be distinct and contained within [the] a boundary defined by said [extended] ring shape or slit shape surface area.

REMARKS

The above amendments are intended to directly respond to the issues raised in the Opinion of the Board of Appeals issuing a new ground of rejection under 35 USC 112, second paragraph. That rejection is based upon a perceived lack of clarity in the language of the claims. The above amendments attempt to make a *bona fide* attempt to address and correct each of those issues.